

JABOTICABA (*MYRCIARIA CAULIFLORA*, BERG.) A DELICIOUS FRUIT WITH AN EXCELLENT MARKET POTENTIAL

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Abstract. The jaboticaba is a delicious fruit indigenous to Brazil, Bolivia, Paraguay and Argentina. The fruit is highly esteemed and is commercially cultivated in large quantities in Brazil. Several factors favor its potential establishment in South Florida including the trees' adaptation to our humid subtropical climate, the large Brazilian population that has settled in Florida, and few pest problems. Brazilians are very familiar with the fruit and have high regard for it, thus providing the initial clientele needed for its commercial production. The main drawbacks for commercial production include: the trees slow grow rate, taking 5 to 7 years to begin production; the lack of superior cultivars; difficulty in picking the fruit and; trees are not well adapted to the highly calcareous, high pH soils in southern Miami-Dade County, thus requiring minor element applications. This paper covers a brief botanical description, cultural practices and the potential market for this under exploited fruit.

Background

Jaboticaba (*Myrciaria cauliflora* [Mart.] Berg) is a member of the Myrtaceae. Jaboticabas are considered a complex of closely related species (Wiltbank et al., 1983). Relatives include guava (*Psidium guajava* L.), crape myrtle (*Lagerstroemia indica*, L.), and feijoa (*Feijoa sellowiana*, Berg). The jaboticaba is native to the subtropical areas of Brazil and is planted commercially around Rio de Janeiro, Minas Gerais, Espirito Santo, São Paulo, Parana and other provinces where there is an excellent large market for the fruit (Coppens and Libreros, 2001; Gomes, 1972; Morton, 1987; Wiltbank et al., 1983). Jaboticaba is grown in Brazil, Central and South America, and south Florida (U.S.). Most information about jaboticaba comes from Brazil where it originated. There have only been three presentations about jaboticaba in the Proceedings of the Florida State Horticultural Society in the last 50 years. More information is needed about growing this fruit in Florida. Basic information on its culture is provided in this paper to fill this need. This presentation with photographs can be seen at the Miami-Dade County Extension website <http://miami-dade.ifas.ufl.edu/>.

Mature trees have tolerated 26-29°F for a few hours in Florida and there is a report of a young tree with only leaf and

branch damage at 18°F (Morton, 1987). Jaboticabas flower more profusely under cold and dry conditions during the winter (Giacometti and Lleras, 2006; Wiltbank et al., 1983). They require full sun, respond well to rainfall or irrigation, and are very susceptible to toppling (observations by authors in Florida).

Jaboticabas grow best in rich, deep, slightly acid soils. Trees can also be grown in rocky alkaline or sandy soils if supplied with minor nutrients. The tree does not tolerate saline water or drought, but responds well to mulching, composts, and peatmoss soil amendments (Phillips and Goldweber, 1978). Trees can be grown in artificial media in containers, e.g., 20 gallon or greater containers. The tree can also be used as an ornamental specimen or for hedges (Ackerman, 1978; Whitman, 2001).

Botanical Description

Trees are small to medium sized, evergreen with symmetrical, dense canopy either single or sometimes multi-trunked (Joyner, 2006). Trees grow slowly and in Florida seldom exceed 15 feet and may be used as specimen trees in backyards because of their ornamental value. The attractive scaly bark of the trunk and branches has whitish to dark brown patches and some trunks have a reddish color. The lanceolate to elliptic, opposite leaves are 1-2 inches long and half an inch wide, dark green, smooth and shiny.

Flowers are white, small in size, and profuse in adult trees, single or in clusters arising directly from the trunk and fairly thick branches (>1/2 inch). Trees bloom several times a year. Fruit (berries) are muscadine grape-like, globose to round and have a maroon to black skin. The skin is 33-49% of the fruit weight (de Jesus et al., 2004). Fruits weigh 3-15 gm (0.1-0.8 oz) and are 1/2 to 1 1/4 inches in diameter. The pulp is whitish, gelatinous with 1-4, oval to round and laterally compressed seeds. Seeds are 13-35% of fruit weight. Fruits are produced directly from the trunk and branches, singly or in clusters with several crops a year. The trees usually take 7 to 10 years to fruit from seed. Fruits are excellent to pleasant to eat and have a subacid and sweet flavor with 14.0° Brix (Mootoo and Henry, 1996).

Jaboticaba usually have a main crop in the spring and 3 to 5 other smaller crops during the year (Duarte, 2003a,b). It takes 20-30 days from bloom to fruit maturity. In Florida, yield is estimated at 30-125 lbs per adult tree but mostly 30 to 50 lbs (personal communication with growers). Production may begin in 4-15 years but usually 8 to 10 years from seed and about 6-7 years from vegetatively propagated by grafting, cuttings, air layering (Duarte and Huete, 1996a,b; Hoyos, 1994; Wiltbank et al., 1983). Each harvest season lasts about two weeks.

Cultural Practices

Jaboticaba trees may become large after many years. Close initial in-row spacings of 10 to 12 ft may be justified because of the slow growth habit of the tree. A minimum of 15 to 20 feet between rows should give plenty of space. At 10 ft × 15 ft

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and 12 ft × 20 ft spacing there will be 290 to 181 trees per acre, respectively. Jaboticabas can also be planted in 10-20 gallon containers using an organic matter-rich medium.

Jaboticabas are commonly planted from seed. Interestingly, *M. cauliflora* produces apomictic, polyembryonic seeds where all seedlings are identical to the mother tree (Giacometti, 2006). In contrast, *M. jaboticaba*, another jaboticaba species, produces zygotic, monoembryonic seeds with variability in the seedling population. Some references indicate the existence of hybrids between these two species (Hoyos, 1994; Wiltbank et al., 1983). Brazilian cultivars Sabara and Paulista are popular but difficult to obtain in Florida. Likewise, in South Florida the cultivars Grimal, Youngmans and Whitman (Sabara) are also very difficult to find.

Jaboticaba is mostly propagated by seeds but can be vegetatively propagated by cuttings, approach and side veneer grafts, micro grafting and by air layering (Campbell, 1982; Duarte and Huete, 1996a,b; Hoyos, 1994; Ogden and Wiltbank, 1983). Vegetatively propagated trees are precocious but still take several years (4-6) to begin production because of juvenility or slow growth. Vegetative propagation is difficult (Argles, 1976; Larson et al., 1991). Scalopi et al. (2003) had 30-31% rooting with IBA treated cuttings of *M. dubia* while Duarte and Huete (1996a) obtained 60% rooting with IBA treated, 10 cm long, leafy jaboticaba cuttings taken from June to September and grown in a hermetically sealed plastic chamber at 50% shade.

There are reports that plantings with more than one cultivar or seedling type produce better than those with just one cultivar (Duarte, 2003a,b; Morton, 1987). Jaboticabas respond very well to organic matter so the use of peat, compost, or well decomposed manure is recommended. Mulching is also beneficial; use a 4-6 inch layer of mulch beginning 8-12 inches from the trunk and covering most of the area under the canopy.

There is not much information on jaboticaba fertilization (Ackerman, 1978; Phillips and Goldweber, 1978). Use the same fertilization technique as for other fruits in South Florida which is frequent applications (every 1-2 months) with small amounts ($\frac{1}{4}$ - $\frac{3}{4}$ lb/tree), depending on tree size. Increase the amount as trees grow larger. Use four applications per year beginning the 3rd year. Use 4-6 applications of nutritional sprays from April to October and one to two soil drenches with 2-4 oz. of iron chelate (for adult trees) from June to September for trees growing in alkaline soils. Use a total of 15-20 lbs. of 6-6-6 or 8-3-9 or similar mix per adult tree per year.

Jaboticabas are susceptible to drought. Trees should be irrigated regularly during the dry months (November-May in Florida) if it does not rain. Irrigation is important from flowering to harvest.

There are no serious insect pests and diseases in Florida at the present time. It is important to plant pest and disease free vines. A leaf rust fungus is sometimes present and anthracnose sometimes has caused severe rotting of vines. Birds and animals will eat the berries.

Light pruning is required to remove dead, damaged, and crossed branches. Removal of many of the thin inside shoots is also recommended. Trees should be topped to reduce height to about 10-12 feet. Tree size may also be influenced by grafting and growth regulators (Donadio et al., 2002). Dwarf plants have been reported and could also be used in high density plantings (de Jesus et al., 2004).

Harvesting is tedious and expensive due to the small fruits which have to be harvested individually. This is a major drawback in growing jaboticabas (Cannon, 1999; Coppens and Libreros, 2001).

Postharvest, Packing and Marketing

Jaboticabas are very perishable (de Jesus et al., 2004; Duarte et al., 1996; Mootoo and Henry, 1996). At warm temperatures fruits get soft by the second day and shrivel and begin to ferment by the third day. Rapid, proper packing and distribution to the markets are very important. Refrigeration is very helpful and will prolong the shelf life of the fruit. Wrapping with polythene film prolongs shelf life to about two weeks without refrigeration and for a month with it (Duarte et al., 1996; Mootoo and Henry, 1996). Wrapping and or the use of small plastic containers such as plastic wrapped strawberry, blueberry/blackberry baskets; clam shells, dramatically increase shelf life with refrigeration and this is the way to pack and store them. This will guarantee an excellent product. Because jaboticaba production is labor intensive and expensive to maintain, high fruit prices are required to make a profit. The best markets are in cities with a large population of Brazilians and to a smaller degree, people originating from neighboring countries that know the fruit in South America.

There is a large population of Brazilians in South Florida (Broward, Miami-Dade, Palm Beach) and from Orlando. This is the obvious market first and then later the northeastern U.S. Because of the closeness of the consumers to the production area (from Miami-Dade to Palm Beach) this should be the target area for any initial marketing effort. It is extremely difficult to get any information on market prices so the information comes from local growers with one to few trees (personal communication). Expected maximum price to growers should be \$4.00 to \$5.00 per pound. Next-day shipping prices are \$1.00-\$3.50 per pound depending on the type of shipping used. Without refrigeration, jaboticabas must reach the market in one or two days. At the above shipping prices, growers must realize that buyers may not be able to afford \$5.00/lb. Growers should be ready to adjust their selling price to be able to sell jaboticabas. Growers should look for buyers (Brazilian markets and restaurants, gift shippers, chefs, etc.) because these buyers are willing to pay the high price for this wonderful but hard to find fruit.

Jaboticabas are highly nutritious and are mostly eaten as fresh fruit but are also processed to make juice, wine, liquor, vinegar, jam, jelly and marmalade (de Jesus et al., 2004; Wiltbank et al., 1983). They can be preserved by freezing. They are excellent specimen plants for the home landscape and they are very well adapted to South Florida.

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